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SECURITY INFORMATION
CENTRAL INTELLIGENCE AGENCY

REPORT

CD NO.

50X1-HUM

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COUNTRY German Democratic Republic

SUBJECT Economic - Technological, steel specifications

DATE OF INFORMATION 1950

DATE DIST. 19 Apr 1952

NO. OF PAGES 33

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SUPPLEMENT TO REPORT NO.

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INDEX LIST OF STEEL TYPES
OF GDR MAIN DEPARTMENT FOR METALLURGY

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Index List of Steel Types

Steel Types According to DIN (German Industrial Standards) Specifications

Steel for machine building, nonalloyed (section steel, steel bars, flat bar-steel	Sheet 1
Structural steel	" 2
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Sheet (heavy, medium, and thin sheet)	" 6
Thin sheet	" 7

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Steel Types According to GOST Specificiations — Sheet 8

Special-Purpose Steel Types

Railroad steel " 9
Wire " 10

Further sheets on tool steel and special-quality steel types are in preparation, and will be added to this list as soon as production of them becomes feasible.

A temporary, arbitrary list of special-quality types which have already been produced is given on sheet 11.

Special sheets are being prepared listing those types of steel which are being produced in plants not belonging to the Main Department for Metallurgy.

The Index List of Steel Types of the Main Department for Metallurgy of the Ministry of Industry contains those steel types which are being produced in the German Democratic Republic at present. Steel types not listed in the index are not being produced. In exceptional cases the Main Department for Metallurgy can make a decision, after checking with the Iron Research Institute (Corporation of Public Law), Hennigsdorf, on production possibilities.

DIN specificiations were the basis for the Index List of Steel Types. To supplement this list, types on the SEL (Steel-Iron List), the specifications for which conform with those of the norm DIN 17006, are also given. Types given in parentheses in the "DIN" and "SEL" columns are those for which the designations given do not conform fully with both sets of specifications. Analysis values given in parentheses in the "Composition" column indicate that these either are not contained in the DIN specifications or do not conform to them. The analysis values in parentheses are valid as basic values for the steel mill, but not in regard to acceptance.

The following abbreviations are used in the "Method of Production" column:

M -- Open hearth steel
T -- Thomas steel
Ts - Thomas steel, special quality
E -- Electrosteel
b -- Killed steel (beruhigt)
u -- Rimmed steel (unberuhigt)

Abbreviations in the column "Producing Plant," which indicates the steel enterprises of the VVB Vereta (Federation of People-Owned Iron and Steel Enterprises), are as follows:

H -- Hennigsdorf
R -- Riesa
M -- Maxhuette
G -- Groeditz
D -- Doehlen
\+ means "is produced"
\- means "is not produced"

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Color designations of steel types will be as follows: w (white), ge (yellow), gr (green), r (red), b (blue), and s (black). The letters M, T, E, etc., used in the Index List of Steel Types indicate the method of production and are not part of the color classification.

Other abbreviations used in the tables include:

ca	-- approximately
max	-- maximum
min	-- minimum
mm²	-- square millimeters
kg	-- kilograms
kgm	-- kilogram-meter
σ_B	-- tensile strength
σ_s	-- yield point
δ_5	-- reduction of area
δ_{10}	-- elongation [at yield point]

[It is not certain whether or not the figures 5 and 10 refer to the size of the test piece. The meaning of the symbol $\mathcal{E}$ was not definitely established, but it appears to be a measure of impact strength.]

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Ministry of Industry Main Department for Metallurgy					Steel for Machine-Building, Nonalloyed										
Index List of Steel Types					Section Steel, Steel Bars, Flat Bar-Steel										
DIN		Method of Production	GEL		Producing Plant								Composition		
Sheet	Designation		No	Designation	H	R	M	G	D				C %	Si %	Mn %
1611	St 00-11	M, T			+	+	+	–	–				Without guarantee		
	St 37-11	M, T			+	+	+	–	–						
	St 34-11 (1)	Mb	(16)	(Mb 7)	+	+	–	–	–				ca .12 (max .10)	(.25-.35)	(.25-.40)
		Mu	(19)	(Mu 7)	+	+	–	–	–				ca .12 (max .12)	Sp.	(.25-.40)
	St 42-11 (1)	Mb	(71)	(Mb 22)	+	+	–	–	–				ca. .25 (.18-.28)	(.25-.35)	(.25-.40)
		Mu	(72)	(Mu 22)	+	+	–	–	–				ca. .25 (.18-.28)	Sp.	(.25-.40)
	St 50-11	M	(85)	(M 33)	+	+	–	(+)	–				ca. .35 (.28-.38)	(.30-.50)	(.40-.60)
	St 60-11	M	(93)	(M 44)	+	+	–	(+)	–				ca. .45 (.40-.50)	(.30-.50)	(.45-.65)
	St 70-11	M	(108)	(M 59)	+	+	–	(+)	–				ca. .60 (.53-.65)	(.30-.50)	(.50-.70)
1612	St 00-12	M, T			+	+	+	–	–				(max .35)	Without guarantee	
	St 34-12 (1)	Mb	(16)	(Mb 7)	+	+	–	–	–				max .20 (max .10)	(.25-.35)	(.25-.40)
		Mu	(19)	(Mu 7)	+	+	–	–	–				max .20 (max .10)	Sp.	(.25-.40)
	St 37-12 (1)	Mb	(51)	(Mb 13)	+	+	–	–	–				max .20	(.25-.35)	(.25-.40)
		Mu	(53)	(Mu 13)	+	+	–	–	–				max .20	Sp.	(.25-.40)
		T	(54)	(Tu 13)	–	–	+	–	–				max .16	Sp.	(.25-.40)
	(Thomas special quality) (2)	Ts			–	–	+	–	–				max .16	Sp.	(.25-.40)

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Steel for Machine-Building, Nonalloyed

Section Steel, Steel Bars, Flat Bar-Steel (Contd)

Sheet 1

Mar 1950

Composition			Mechanical Properties Remarks						Color Designation
P max %	S max %	P + S max %	σ_B kg/mm²	δ_5 min %	δ_{10} min %	Yield Points Guaranteed for Qualities for German Reichsbahn			
						σ_S min kg/mm²	Designation		
Without guarantee			Without guarentee						
			37-45	25	20				
.060	.060	.10	34-42	30	25	19	St 34-11R		ge gr
.060	.060	.10							ge
.060	.060	.10	42-50	25	20	23	St 42-11R		gr ge
.060	.060	.10							gr b
.060	.060	.10	50-60	22	18	27	St 50-11R		r
.060	.060	.10	60-70	17	14	30	St 60-11R	For coupling parts σ_S min 35 kg/mm²	h
.060	.060	.10	70-85	12	10	35	St 70-11R		s
Without guarantee			34-50	22	18				
.060	.060	.10	34-42	30	25				ge gr
.060	.060	.10	37-45	25	20				ge
.060	.060	.10							ge w
.060	.060	.10							w
.060	.060	.10							w bl
<.08>	.060	<.12>							b
.060	.060	.10							

(1) When ordering, indicate whether killed or rimmed steel is desired

(2) Thomas steel sections { I 30 and larger; [26 and larger; L 100 × 100 and larger } will be delivered only in "Thomas special quality."

Sections { I 20-30 will be delivered; [20-26 } in "Thomas special quality" steel if so desired. Sections under I-20 and [-20 will be delivered only according to DIN 1612.

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1612	St 42-12 (1)	Mb	(71)	(Mb 22)	+	+	−	−	−		(.18-.28)	(.25-.35)	(.25-.40)
		Mu	(72)	(Mu 22)	+	+	−	−	−		(.18-.28)	Sp.	(.25-.40)
		T	(57)	(Tu 14)	−	−	+	−	−		(max .18)	Sp.	(.25-.40)
	(Thomas special quality)	Ts			−	−	+	−	−		(max .18)	(.30-.50)	(.25-.40)
St 42 Thomas quality		T			−	−	+	−	−		(max .18)	(.30-.50)	(.25-.40)
St 50 Thomas quality		T	(77)	(Tb 23)	−	−	+	−	−		(max .25)	(.30-.50)	(.40-.60)
St 60 Thomas quality		T	(82)	(Th 30)	−	−	+	−	−		(max .35)	(.30-.50)	(.45-.65)
St 70 Thomas quality		T	(90)	(T 35)	−	−	+	−	−		(max .40)	(.30-.50)	(.50-.70)

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.060	.060	.10	42-50	24	20	
.060	.060	.10				
(.080)	.060	(.12)				
.060	.060	.10				
.080	.060	.12	42-50	25	20	
.080	.060	.12	50-60	22	18	
.080	.060	.12	60-70	17	14	
.080	.060	.12	70-85	12	10	

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Ministry of Industry Main Department for Metallurgy

Index List of Steel Types

Structural Steel

DIN Sheet	DIN Designation	Method of Production	SEL No	SEL Designation	Producing Plant H	R	M	G	D	Composition C %	Si %	Mn %
1613	St 38-13	Mu	(19)	(Mu 7)	+	+	–	(+)	–	(.10-.16)	Sp	(.25-.40)
		T	(15)	(Tu 6)	–	–	+	–	–	(max .08)	Sp	(.25-.40)
	St 34-13	Mu	(19)	(Mu 7)	+	(+)	–	(+)	+	(.05-.10)	Sp	(.25-.40)
	St 35-13K	Mu	(28)	(Mur 8)	+	(+)	–	(+)	+	.06-.11 (.06-.10)	Sp	max .45 (.30-.45)
1651	9 S 20	T	(34)	(9 S 20)	–	–	+	–	–	.05-.12	Sp	.40-.70 (.40-1.0)
	10 S 20	T	(43)	(10 S 20)	–	–	+	–	–	.06-.13	max .40 (.25-.35)	.40-.70 (.40-1.0)
	15 S 20	T	(62)	(15 S 20)	–	–	+	–	–	.11-.18	max .40 (.25-.35)	.40-.70 (.40-1.0)
1666	C 15 (St C 1661)	M, E	(58)	(C 15)	+	–	–	(+)	+	.11-.18	.15-.40 (.25-.35)	.20-.40 (min .30)
1667	C 22 (St C 25.61)	M, E	(68)	(C 22)	+	–	–	+	+	.19-.25	.15-.40 (.25-.35)	.20-.40 (min .30)
	C 35 (St C 35.61)	M, E	(86)	(C 35)	+	–	–	+	+	.32-.40	.30-.50	.40-.60
	C 45 (St C 45.61)	M, E	(94)	(C 45)	+	–	–	+	+	.42-.50	.30-.50	.45-.65
	C 60 (St C 60.61)	M, E	(109)	(C 60)	+	–	–	+	+	.57-.65	.30-.50	.50-.70
		E (M)	59	Ck 15 ×	–	–	+	–	+	.12-.18	.15-.35 (.25-.35)	.25-.50 (min .30)

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Structural Steel (Contd)

Sheet 2

Mar 1950

Composition			Remarks Mechanical Properties					Color Designation
P max %	S max %	P + S max %	σ_B kg/mm²	δ_5 min %	δ_{10} min %			
(.060)	(.050)		36-45	25	20	Steel for Screws		b w
(.080)	(.060)	(.12)						b w
.060	(.050)		34-42	30	25			b gr
.050 (.050)	.050 (.040)	.090	35-42	30	25	"Vesta" specification for chain steel	P max .035 S max .035	b ge
.050-.100	.15-.30		Automatic steel types					s w
.050-.090	.15-.30							s ge
.050-.090	.15-.30							s gr
.050 (.045)	.050 (.045)	.090	σ_B kg/mm²	δ_5 min %	σ_S min kg/mm²	Carburizing steel C 15 and C 22 mech prop see DIN 1666		M r w
.050 (.045)	.050 (.045)	.090	42-50	27	24	Condition: normally annealed	Carburized and heat-treated steel types X Ck 15 can also be delivered in an age-resistant, open-hearth grade, with Al added.	M r ge
.050 (.045)	.050 (.045)	.090	50-60	22	20			M r gr
.050 (.045)	.050 (.045)	.090	60-72	17	34			M r b
.050 (.045)	.050 (.045)	.090	70-85	14	39			M r s
.035	.035		Carburizing steel: mech. properties for Ck 15 and Ck 22 see DIN 1666					E r w

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		E (M)	69	Ck 22*	–	–	+	–	+			.18-.25	.15-.35 (.25-.35)	.25-.50 (min .30)
		E	87	Ck 35	–	–	+	–	+			.32-.40	.25-.50 (.30-.50)	.40-.70
		E	95	Ck 45	–	–	+	–	+			.42-.50	.25-.50 (.30-.50)	.50-.80
		E	110	Ck 60	–	–	+	–	+			.57-.65	.25-.50 (.30-.50)	.50-.80
1669	48 S 7	M, E	(156)	51 Si 7	+	–	+	–	–			.40-.55 (.48-.55)	1.5-1.8	.50-.75
	55 S 7	M, E	(157)	55 Si 7	+	–	+	–	–			.50-.60	1.4-1.9	.50-.90
	65 S 7	M, E	(158)	65 Si 7	+	–	+	–	–			.60-.70	1.4-1.9	.50-.90

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.035	.035		Strength properties: 1. Normally annealed -- see row C 22 - C 60 2. Heat-treated -- see steel-iron materials sheet 500-47	*Ck 22 can also be delivered in an age-resistant, open-hearth grade, with Al added.	E r ge
.035	.035				E r gr
.035	.035				E r b
.035	.035				E r s
.050	.050		Spring steel Strength properties: see DIN 1669		M gr r W E gr r W M gr r W E gr r ge M gr r W E gr r gr
.050	.050				
.050	.050				

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Ministry of Industry Main Department for Metallurgy

Index List of Steel Types

Structural Alloy Steel

DIN Sheet	DIN Designation	Method of Production	SEL No	SEL Designation	Producing Plant H	R	M	G	D			Composition C %	Si %	Mn %
1667	32 Mn 5 (VM 125)	E (M)	(174)	(32 Mn 5)	–	–	+	(+)	+			.28-.36	max .40 (.30-.40)	1.2-1.5
	40 Mn 3	E (M)	(170)	(40 Mn 4)	–	–	+	(+)	+			.36-.44	.30-.50 (.30-.40)	.70-1.0
	37 Mn Si 5 (VMS 135)	E (M)	(181)	(37 Mn Si 5)	–	–	+	(+)	+			.33-.41	1.1-1.4	1.1-1.4
	42 Mn V 7	E (M)	(190)	(42 Mn V 7)	–	–	+	(+)	+			.38-.45	max .40 (.30-.40)	1.6-1.9
(Structural steel St 52)		M (E)	(176)	(17 Mn Si 5)	+	+	+	(+)	+			max .20 (.16-.20)	max .80 (.60-.80)	max 1.2 (1.0-1.2)
St 52 can be delivered also with the following composition if desired												max .20 (.16-.20)	max .60 (.40-.60)	max 1.8 1.2-1.6
1666	15 Cr 3 (E C 60)	E (M)	(204)	(15 Cr 3)	–	–	+	(+)				.12-.18	max .40 (.30-.40)	.40-.60
	16 Mn Cr 5 (E C 80)	E (M)	(211)	(16 Mn Cr 5)	–	–	+	(+)	+			.14-.19	max .40 (.30-.40)	1.0-1.3
	20 Mn Cr 5 (E C 100)	E (M)	(218)	(20 Mn Cr 5)	–	–	+	(+)	+			.17-.22	max .40 (.30-.40)	1.1-1.4
	22 Mn Cr 6 (E C 100)	E (M)			–	–	+	(+)	+			.20-.25	max .40 (.30-.40)	1.3-1.6

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Structural Alloy Steel (Contd)										Sheet 3 Mar 1950
Composition										
P max %	S max %	P + S max %	Cr %	V %	Remarks					Color Designation
.040	.040	.070			Strength properties: see DIN 1667					M W s W E W s ge
.040 (.035)	.040 (.035)	.070								M W s ge E W s ge
.040 (.035)	.040 (.035)	.070								M W r W E W r W
.040 (.035)	.040 (.035)	.070		.10-.18						M W ge W E W ge W
.060	.060	.10		Thickness mm	σ_B kg/mm²	σ_s min kg/mm²	δ_5 lengthwise min %	δ_5 across min %	Specifications of the German Reichsbahn	M W r ge
.060	.060	.10		to 18	52-62	36	24	21		E W r ge
				> 18 ≤ 30	52-64	35	23	20		
				> 30 ≤ 50	52-64	34	22	19		
.040 (.035)	.040 (.035)	.070	.50-.80		Strength properties: see DIN 1666					M ge s W E ge s W
.040 (.035)	.040 (.035)	.070	.80-1.1							M W ge W E W ge W
.040 (.035)	.040 (.035)	.070	1.0-1.3							M W ge ge E W ge ge
.040 (.035)	.040 (.035)	.070	1.2-1.5							M W ge r E W ge r

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(1663)	(VC 135)	E (M)	214	34 Cr 4	–	–	+	(+)	+			.30-.37	.15-.35 (.25-.35)	.50-.80
		E	215	41 Cr 4	–	–	+	(+)	+			.38-.44	.15-.35 (.25-.35)	.60-.80
1667	50 Cr V 4 (VCV 150)	E	(216)	(50 Cr V 4)	–	–	+	(+)	–			.47-.55	max .40 (.30-.40)	.70-1.0
	58 Cr V 4	E	(217)	(58 Cr V 4)	–	–	+	(+)	–			.55-.62	max .40 (.30-.40)	.80-1.1

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.035	.035		.90-1.2		Strength properties: see DIN 1666	M [ge] [ge] [ge] E [ge] [ge] [ge]
.035	.035		.90-1.2		Strength properties: see Steel-Iron Materials Sheet 800-47	M [ge] [ge] [ge] E [ge] [ge] [ge]
.040	.040	.070	.90-1.2	.10-.18	Strength properties: see DIN 1667	M [ge] [ge] [ge] E [ge] [ge] [ge]
.040	.040	.070	.90-1.2	.10-.18		M [ge] [ge] [ge] E [ge] [ge] [ge]

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Ministry of Industry Main Department for Metallurgy

Index List of Steel Types

Boiler Plate

DIN		Method of Production	SEL		Producing Plant						Composition		
Sheet	Designation		No	Designation	H	R	M	G	D		C %	Si %	Mn %
	C 12*	M			+	+	–	–	–		~.12 (.07-.15)		~.40 (.30-.55)
	C 18*	M			+	+	–	+	+		~.18 (.15-.20)	~.20 (.10-.30)	~.40 (.40-.60)
	C 25*	M			+	+	–	+	+		~.25 (.23-.28)	~.25 (.25-.35)	~.50 (.50-.70)
	20 Mn 3*	M			+	-	–	+	+		~.20 (.18-.25)	~.35 (.25-.35)	~.80 (.70-.90)
	20 Mn 5*	M			+	-	–	+	+		~.20 (.18-.25)	~.45 (.25-.35)	~1.3 (1.0-1.3)
		M	(38)	(Mbr 10)	+	+	–	–	–		(.06-.13)	(.10-.20)	(.40-.60)
		M	(48)	(Mur 10)	+	+	–	–	–		(.08-.15)	(Sp.)	(.40-.60)
		M	(55)	(Ma 14)*	+	–	–	+	+		(.10-.18)	(.10-.20)	(.55-.75)
		M	(165)	(14 Mn 3)*	+	–	–	+	+		(.14-.20)	(.15-.25)	(.50-.70)
		M	(75)	(Mb 23)*	+	-	–	+	+		(.20-.27)	(.25-.40)	(.60-.80)

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Boiler Plate (Contd)								Sheet 4 Mar 1950
Composition				Mechanical Properties			Remarks	
P max %	S max %		Al %	σ_B kg/mm²	σ_5 (1) min kg/mm²	ε (2) kgm/cm²	ε (3) kgm/cm²	Color Designation
(.050)	(.050)			35-45	19	8	6	For strength calculations and specifications on hot strength see "Material and Construction Specifications for Land Boilers" VTU. Berlin 1947. DIN 1851
(.050)	(.050)			41-50	22	6	4	
(.050)	(.050)			47-56	25	4	3	
(.050)	(.050)			47-56	27	(1) If thickness of plate is over 40 mm, σ_5 may be 1 kg/mm² smaller (2) DMV test, non-aged (3) DMV test, aged		
(.050)	(.050)			50-60	30			
(.050)	(.050)			K I		Designation of boiler plate according to SEL		
(.050)	(.050)							
(.050)	(.050)			K II				
(.050)	(.050)			K III				
(.050)	(.050)			K IV				

*The steel types mentioned are being produced also in an "age-resistant" grade, obtained by adding sufficient deoxidizing Al to make the material age-resistant, and in a "resistant to corrosive liquids" grade, obtained by adding sufficient deoxidizing Al to make it resistant to corrosive liquids.

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Ministry of Industry Main Department for Metallurgy Index List of Steel Types					Steel Pipe								
DIN		Method of Production	SEL		Producing Plant							Composition	
Sheet	Designation (1)		No	Designation	H	R	M	G	D			C %	Si %	Mn %
	St 00.29				+	+	–	–	–			Without guarantee		
	C 12 (St 35.25) St 35.29				+	+	–	–	–			~.12 (.07-.15)	(.06-.20)	~.40 (.30-.55)
1629 and 1625	C 25X (St 45.25) St 45.29				+	+	–	–	+			~.25 (.20-.27)	(.10-.30)	~.50 (.40-.60)
	C 35X (St 55.25) St 55.29				+	+	–	–	+			~.35 (.32-.40)	(.25-.40)	~.55 (.40-.70)
1625	15 Mn 4X (Mn St 45.25)				+	–	–	–	+			~.15 (.10-.18)	(.30-.50)	~1.0 (.90-1.2)
	12 Cr V 5X (Cr V St 50.25)				+	–	–	–	+			~.12 (.07-.15)	(.25-.35)	~.60 (.45-.65)

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Steel Pipe (Contd)								Sheet 5 Mar 1950
Composition					Mechanical Properties			
P max %	S max %	Cr %	V %	Al	σ_B kg/mm²	δ_5 min %	$\sigma_{0.5}$ kg/mm² (2)	Color Designation
Without guarantee					Without guarantee			
.060 (.050)	.060 (.050)				35-45	25	(23)	
.060 (.050)	.060 (.050)				45-55	21	(26)	
.060 (.050)	.060 (.050)				55-65	17	(30)	
.060 (.050)	.060 (.050)				45-58	21	(29)	
.060 (.050)	.060 (.050)	1.2 (1.0-1.3)	.30 (.25-.35)		60-62	18	(32)	

(1) In parentheses former DIN designation.

(2) Yield point specifications according to "Material and Construction Specifications for Land Boilers" VTU. Berlin 1947. DIN 1851

For Rot strength properties, see DIN 1625

*The steel types mentioned are being produced in "age resistant" and "resistant to corrosive liquids" grades, obtained by adding deoxidizing Al.

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Ministry of Industry Main Department for Metallurgy

Index List of Steel Types

Sheet

Heavy Sheet, Medium Sheet and Thin Sheet (1)

DIN Sheet	DIN Designation	Method of Production	Type of Product	Producing Plant H	R	M	G	D			Composition
1621	St 00.21	T, M	Ordinary sheet	+	+	+	–	–			Without guarantee
	St 37.2I	M, T	Construction sheet I	+	+	+	–	–			See Sheet 1
	St 42.21	M, T	Construction sheet II	+	+	+	–	–			DIN 1611 and 1612
1622	St 00.22	T, M	Commercial sheet	+	+	+	–	–			Without guarantee
	St 00.22 S	M	Commerical sheet S	+	–	–	–	–			See Sheet 1 DIN 1611 and 1612
	St 34.22 P	M	Pressed sheet	+	–	–	–	–			
	St 34.22 R	M	Pipe sheet	+	–	–	–	–			
	St 37.22	M, T	Construction sheet I	+	+	+	–	–			
	St 37.22 S	M	Construction sheet I S	+	–	–	–	–			
	St 42.22		Construction sheet II	+	+	–	–	–			
	St 50.22 St 60.22 St 70.22		Steel sheet of greater strength	+	+	–	–	–			
1623	St 00.23	T, M	Sheets with specified strength	+	+	+	–	–			Without guarantee
	St 34.23			+	+	–	–	–			See Sheet 1 DIN 1611 and 1612
	St 37.23			+	+	–	–	–			
	St 42.23			+	+	–	–	–			
	St 50.23			+	+	–	–	–			
	St 60.23			+	+	–	–	–			
	St 70.23			+	+	–	–	–			

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Sheet Heavy Sheet, Medium Sheet, and Thin Sheet (1) (Contd)				Sheet 6 Mar 1950
Mechanical Properties				
σ_B kg/mm²	δ_{10} min % Sheet Thickness/mm 5-10	over 10	Remarks	Color Designation
Without guarantee				
37-45	18	20	Heavy sheet (sheet iron over 4.75 mm)	
42-50	16	20		
σ_B kg/mm²	δ_{10} min %			
<36	—	—	Medium sheet (sheet steel 3 - 4.75 mm)	
34-42	25	S		
34-45	20	P	S - Weldability for fusion welding guaranteed.	
37-45	20	R	R, P - Weldability for fusion and pressure welding guaranteed.	
37-45	20	S		
42-50	20		XX) Elongation figures are rough indications.	
50-60	16XX)			
60-70	12XX)			
70-80	10XX)			
σ_B kg/mm²	δ_{10} min % Sheet Thickness mm (2) 1.88 ≤ 1.5	1.5 ≤ 2	2 ≤ 3	
Without guarantee				
34-42	22	24	25	Thin sheet (1) (sheet steel under 3 mm)
37-45	17.5	19	20	
42-50	17.5	19	20	
50-60	15.5	17	18	
60-70	12	13	14	
70-85	8	9.5	10	

(1) See Sheet 7
(2) Elongation figures are rough indications

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Ministry of Industry Main Department for Metallurgy

Index List of Steel Types

Thin Sheet (under 3 mm)

DIN		Method of Production	SEL		Producing Plant							Composition		
Sheet	Designation		No	Designation	H	R	M	G	D			C %	Si %	Mn %
1623	St I 23	M	(50)	(M 13)	+	+	–	–	–			(max .15)	(max .25)	(max .35)
	St II 23	T	(31)	(T 8)	–	–	+	–	–			(max .12)	(max .25)	(max .35)
	St III 23	M	(51)	(Mb 13)	+	+	–	–	–			(.08-.18)	(.10-.25)	(.20-.45)
		M	(53)	(Mu 13)	+	+	–	–	–			(.08-.18)	(Sp.)	(.20-.40)
		T	(32)	(Tu 8)	–	–	+	–	–			(.05-.12)	(Sp.)	(.20-.40)
	St V 23	M	(16)	(Mb 7)	+	+	–	–	–			(max .10)	(.03-.15)	(.18-.35)
	St VI 23	M	(19)	(Mu 7)	+	+	–	–	–			(max .10)	(Sp.)	(.18-.35)
	St IX 23	T	(15)	(Tu 6)	–	–	+	–	–			(max .08)	(Sp.)	(.18-.35)
	St VII 23	M	(17)	(Mbk 7)	+	–	–	–	–			(max .10)	(.03-.15)	(.20-.40)
	St VIII 23 t St VIII 23 k	M	(18)	(Mk 7)	+	–	–	–	–			(max .10)	(Sp.)	(.20-.40)
	St X 23	M	(9)	(Mbk 6)	+	–	–	–	–			(max .10)	(.03-.15)	(.20-.40)
	(St VIII 23 c)	M	(10)	(Mk 6)	+	–	–	–	–			(max .10)	(Sp.)	(.20-.40)
		E	(37)	(Ck 10Al)	–	–	+	–	–			(max .12)	(max .10)	(.35-.50)

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Thin Sheet (under 3 mm) (Contd)				Sheet 7 Mar 1950
Composition			Remarks	
P max %	S max %	P + S max %	Designation According to DIN 1623	Color Designation
(.090)	(.070)		Commercial Sheet	
(.090)	(.070)			
(.060)	(.060)			
(.060)	(.060)			
(.080)	(.060)			
(.060)	(.060)			
(.060)	(.050)		Quality Sheet	
(.080)	(.060)			
(.040)	(.050)		For strength specifications see DIN 1623	
(.040)	(.050)			
(.030)	(.040)			
(.030)	(.040)			
(.030)	(.040)	met Al (.01-.02)	Sheet for Cams	FI MF

Classification	Type of Product
St I 23	Black sheet I
St II 23	Black sheet II
St III 23	Sheet for enameling and galvanizing
St V 23	Drawn sheet I
St VI 23	Drawn sheet II
St VII 23	Deep-drawn sheet
St VIII 23 t	Special deep-drawn sheet t
St VIII 23 k	Special deep-drawn sheet k
St IX 23	Sheathing
St X 23	Auto-body sheet

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Ministry of Industry Main Department for Metallurgy		Steel Types According to GOST Classification												
Index List of Steel Types														
GOST		Producing Plant							Method of Production	Composition				
380-41	Designation	H	R	M	G	D				C %	Si %	Mn %	P max %	S max %
Group A	St 0	+	+	–	–	–				max .23	Without guarantee		.070	.060
"	St 1	+	+	–	–	–							.050	.055
"	St 2	+	+	–	–	–							.050	.055
"	St 3	+	+	–	–	–							.050	.055
"	St 4	+	+	–	–	–							.050	.055
"	St 5	+	+	–	–	–				Without guarantee			.050	.055
"	St 6	+	+	–	–	–							.050	.055
"	St 7	+	+	–	–	–							.050	.055
Group B	M St 0	+	+	–	–	–				max .23	Without guarantee		.070	.060
"	M St 1	+	+	–	+	+				.07-.12	Sp.	.35-.50	.050	.055
"	M St 2	+	+	–	+	+				.09-.15	Sp.	.35-.50	.050	.055
"	M St 3	+	+	–	+	+				.14-.22	.12-.35 (.25-.35)	.35-.60	.050	.055
"	M St 4	+	+	–	+	+				.18-.27	.12-.35 (.25-.35)	.40-.70	.050	.055

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Steel Types According to GOST Classification (Contd)					Sheet 8
					Mar 1950
Mechantcal Properties					
σ_B kg/mm^2	Stretch at σ_B	δ_{10} min %	δ_5 min %	σ_{S_2} kg/mm^2	Color Designation
32-47	37-47	18	22	19	
32-40	32-47	28	33	—	
34-42	34-42	26	31	21	
38-47	38-40	23	27	22	
	41-43	22	26		
	44-47	21	25		
42-52	42-44	21	25	24	
	45-48	20	24		
	49-52	19	23		
50-62	50-53	17	21	27	
	54-57	16	20		
	58-62	15	19		
60-72	60-63	13	15	30	
	64-67	12	14		
	68-72	11	13		
min 70	70-74	9	11	—	
	75-79	8	10		
	80 and over	7	9		
(32-47)	(37-40)	(18)	(22)	(19)	
(32-40)	(32-47)	(28)	(33)	—	W | S | V
(34-42)	(34-42)	(26)	(31)	(21)	V | Ge
(38-47)	(38-40)	(23)	(27)	(22)	W | r
	(41-43)	(22)	(26)		
	(44-47)	(21)	(25)		
(42-52)	(42-44)	(21)	(25)	(24)	W | s
	(45-48)	(20)	(24)		
	(49-52)	(19)	(23)		

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Group B	M St 5	+	+	−	+	+				.28-.37	.17-.35 (.25-.35)	.50-.80	.050	.055
"	M St 6	+	+	−	+	+				.38-.50	.17-.35 (.25-.35)	.55-.80	.050	.055
"	M St 7	+	−	−	+	+				.50-.63	.17-.35 (.25-.35)	.55-.80	.050	.055
"	T St 0	−	−	+	−	−				max .14	Without guarantee		.090	.070
"	T St 3	−	−	+	−	−				max .12	.10-.35 (.25-.35)	.25-.55 (.35-.55)	.080	.065
"	T St 4	−	−	+	−	−				.13-.20	(.25-.35)	.40-.70	.080	.065
"	T St 5	−	−	+	−	−				.21-.30	.10-.35 (.25-.35)	.50-.80	.080	.065
Analysis tolerances for finished material		Lower than minimum								− .02	—	− .03	—	—
		Higher than maximum								+ .03	—	+ .05	+ .005	+.005

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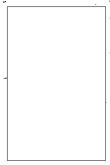

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(50-62)	(50-53) (54-57) (58-62)	(17) (16) (15)	(21) (20) (19)	(27)	w gr
(60-72)	(60-63) (64-67) (68-72)	(13) (12) (11)	(15) (14) (13)	(30)	w b
(min 70)	(70-74) (75-79) (80 and over)	(9) (8) (7)	(11) (10) (9)	—	w r a
Upon demand the same mechanical properties will be guaranteed for steel types in Group B					w r w a w gr

XDelivered also in "age-resistant" grade.

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S-E-C-R-E-T

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Ministry of Industry Main Department for Metallurgy

Index List of Steel Types

Railroad Steel

DIN		Method of Production	SEL		Producing Plant						Composition		
Sheet	Designation		No	Designation	H	R	M	G	D		C %	Si %	Mn %
1667	(C 60) (St C 60.61)	M	(115)	(C 67)	–	–	–	+	–		.60-.68	.25-.35	.50-.80
		M	(109)	(C 60)	–	–	–	+	–		.57-.65		
		M	(102)	(C 53)	–	–	–	+	–		.50-.58		
	(C 45) (St C 45.61)				–	–	–	+	–				
		M	(94)	(C 45)	–	–	–	+	–		.40-.48		
	(C 35) (St C 35.61)	M			–	–	–	+	–		.25-.35		.40-.70
1666	(C 22) (St C 25.61)	M	(68)	(C 22)	–	–	–	+	–		.17-.25		
		M			–	–	–	+	–		.55-.65		
(S 49 Reichsbahn)		T			–	–	+	–	–		.35-.45	max .35 (.25-.35)	.60-1.2
		M	(39)	(Mk 10)	+	–	–	–	–		.07-.13	Si.	.30-.50
(St 44)		M			+	–	–	+	+		.08-.12	.20-.35	.30-1.0
					–	–	–	+	–				

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Railroad Steel (Contd)									Sheet 9 Mar 1950
Composition				Mechanical Properties Intended Use					
P max %	S max %	P + S max %	Cr %	σ_B kg/mm²	δ_{10} min %	δ_5 min %	S (1)		Color Designation
.050	.050	.090		80-92			+	Locomotive tires	
				75-85	11	14		Light wheel centers	
				70-82			+	Wheel rims for rail motor cars	
				60-72			+	Wheel rims for railroad cars	
				50-60	18	22	+	Axles for locomotives and cars	
				42-50	20	22		Wheel centers	
.035	.035		1.1-1.3	100-115	10		+	Wheel rims for rail motor cars	
.090	.060	.13		min 70			+	Rails	
.040	.040	.070		34-42	25	30	σ_S kg/mm² 21	Spacer bolts	
.060 (.050)	.060 (.050)			44-52		27		Rivet steel	b l s
				min 65		18	ξ kgm/cm² (6)	Axles for rail motor cars	

(1) s - Schlag Test

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Ministry of Industry Main Department for Metallurgy

Index List of Steel Types

Wire

DIN		Method of Production	SEL		Producing Plant						Composition		
Sheet	Designation		No	Designation	H	R	M	G	D		C %	Si %	Mn %
Thomas Steel - Special Quality		Ts			-	-	+	-	-		max .16	Sp.	.25-.40
		M	(64)	(M 17)	+	-		-	-		(.15-.19)	(.10-.25)	(.30-.60)
			(70)	(M 22)	+	-	-	-	-		(.20-.24)		
			(81)	(M 27)	+	-	-	-	-		(.25-.29)		
			(88)	(M 35)	+	-	-	-	-		(.30-.39)		
			(96)	(M 45)	+	-	-	-	-		(.40-.49)		
			(106)	(M 55)	+	-	-	-	-		(.50-.60)		
			(104)	(Mk 53)	+	-	-	-	-		(.50-.54)	(.10-.20)	(.25-.45)
			(107)	(Mk 58)	+	-	-	-	-		(.55-.59)		
		E	(113)	(Mk 63)		-	+	-	+		(.60-.64)	(.10-.20)	(.25-.45)
			(117)	(Mk 68)	-	-	+	-	+		(.65-.69)		
		E	(122)	(Mk 73)	-	-	+	-	+		(.70-.74)	(.10-.20)	(.25-.45)
			(128)	(Mk 78)	-	-	+	-	+		(.75-.79)		
		E	(121)	(Mk 72)	-	-	+	-	-		(.70-.74)		(.25-.40)
			(127)	(Mk 77)	-	-	+	-	-		(.75-.79)		
		F	(131)	(Mk 83)	-	-	+	-	+		(.80-.84)	(.10-.20)	(.25-.45)
			(136)	(Mk 88)	-	-	+	-	+		(.85-.89)		
		E	(130)	(Mk 82)	-	-	+	-	-		(.80-.84)		(.25-.40)
			(135)	(Mk 87)	-	-	+	-	-		(.85-.89)		
		E	(139)	(Mk 93)	-	-	+	-	+		(.90-.94)		(.25-.45)
			(138)	(Mk 92)	-	-	+	-	-		(.90-.94)		(.25-.40)
			(143)	(Mk 97)	-	-	+	-	-		(.95-.99)		

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Wire (Contd)

Sheet 10

Mar 1950

Composition			Remarks			Color Designation
P max %	S max %	Σ (P+S) max %	Quality Grade	Degree of Hardness	Examples of Use	
.060	.060	.10	III	1-2		
(.050)	(.050)			2-3		
				3-4		
				4-5		
(.035)	(.035)	(.060)	II	5-6	Scraper wire	
(.035)	(.035)	(.060)	II	6-7	Hoisting cable	
(.035)	(.035)	(.060)	II	7-8	Hoisting cable	
(.025)	(.025)		I		Piano wire	
(.035)	(.035)	(.060)	II	8-9	Hoisting cable	
(.025)	(.025)		I		Piano wire	
(.035)	(.035)	(.060)	II	9-10	Hoisting cable	
(.025)	(.025)		I		Piano wire	

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Ministry of Industry Main Department for Metallurgy

Index List of Steel Types

Special-Purpose Steel

		Method of Production	SEL No	SEL Designation	Producing Plant H	R	M	G	D		Composition C %	Si %	Mn %
		T		(T 40)	–	–	+	–	–		.34-.43	max .30	.50-.80
	DIN 11100 Plowshare steel	M (T)			–	–	–	–	–		.34-.43	min .60 (.60-.80)	(.80-1.0)
		T	(12)	(6 P 15)	–	–	+	–	–		max .09	Sp.	.18-.35
		T	(14)	(6 P 30)	–	–	+	–	–		max .09	Sp.	.18-.35
		M (E)	(7)	(Mk 5)	+	–	–	–	+		max .12 (.06-.12)	max .06	.50-.70
		E		(8 Mn 6)	–	–	–	–	+		max .12 (.06-.11)	max .06	1.4-1.8
		E		(25 Mn 6)	–	–	–	–	+		(.20-.30)	max .06	1.4-1.8
		E	(210)	(100 Cr 4)	–	–	+	–	–		1.0-1.15	.15-.35 (.25-.35)	.60-.80
		E	(231 a)	(100 Cr 6)	–	–	+	–	–		.95-1.05	.15-.35 (.25-.35)	.25-.40
		M	(150)	(8 Si 3)	+	–	–	–	–		max .10 (.06-.08)	.50-.80	max .30 (.20-.35)

Adjoins page 33 here.

50X1-HUM

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Special-Purpose Steel (Contd)

Composition						Type of Use	Color Designation
P max %	S max %	P + S max %	Cu %	Cr %	Ni %		
.090 .070	.060 .060	(Mn + Si)	min 1.4			Plowshare steel	lb lr
.12-.20	.050					Hot-press nut steel	ge lr
.25-.35	.050						ge lb
.030 (.025)	.030 (.025)	.055	max .30			Welding wire	ge w
.030	.030	.055	max .30				
.030	.030	.055	max .30				
.030 (.025)	.030 (.025)			1.0-1.2	from scrap .30	Ball-bearing steel	
.030 (.025)	.025			1.4-1.6 (1.25-1.5)			
.040	.040		max .30			Dynamo sheet, $\leq$ 3.6 w/kg	

All analysis factors constitute rough indications and must be put in parentheses.

[Continue page 32 here.]

S-E-C-R-E-T

S-E-C-R-E-T

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